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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/578,461
Filing Date: May 08, 2006
Appellant(s): SCHWAB, CLEMENS

John S. Economou
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 10, 2009, appealing from the Office action mailed March 23, 2009.

(1) Real party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

Examiner is unaware of any related appeals or interference which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellants' statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection in the brief is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

Number	Name	Date
JP 10-144333	Honda et al.	May 29, 1998

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 5-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Honda et al. (JP 10-144333).

With regard to Claim 5, Honda et al. discloses a fuel cell system (1) for mobile use comprising: a fuel cell unit (2) for generating electrical energy and fuel cell waste products (paragraphs 0009-0011); a cooling circuit including assigned to the fuel cell unit and having a heat exchanger (51) downstream of the fuel cell unit (2); an adsorption accumulator (5) assigned to the fuel cell unit and forming a heat store adapted to release heat when adsorbing the fuel cell waste products, the adsorption accumulator being operatively thermally connected to the heat exchanger (51) (paragraphs 0012-0013); a first line connected to the fuel cell unit (2) discharging the fuel cell waste products from the fuel cell unit, running through pump (40); and a second

line connecting the first line to the adsorption accumulator (5) for feeding the fuel cell waste products to the adsorption accumulator (5).

The phrases "for mobile use", "for generating electrical energy", and "for feeding the fuel cell waste products to the adsorption accumulator", are considered functional language which impart intended use to the structural limitations of the claim. Therefore, while the intended use language of the claim has been considered with regard to structure, it is not given patentable weight because it is directed to a process of use and not directed to the structural features of the product. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. See MPEP 2111. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. See MPEP 2113. The prior art teaches the structural limitations of the claim, including the structural limitations required by the functional language.

With regard to Claim 6, Honda et al. discloses wherein the adsorption accumulator (5) includes a silica gel adsorbent material (52) (paragraph 0012).

With regard to Claim 7, Honda et al. discloses a method for operating a fuel cell system for mobile use, the fuel cell system(1) including a fuel cell unit (2) for generating electrical energy and fuel cell waste products (paragraphs 0009-0011), a cooling circuit assigned to the fuel cell unit (2) and having a heat exchanger (51) downstream of the fuel cell unit (2), an adsorption accumulator (5) assigned to the fuel cell unit (2) and

forming a heat store adapted to release heat when adsorbing the fuel cell waste products, the adsorption accumulator (5) being operatively thermally connected to the heat exchanger (51) (paragraphs 0012-0013), a first line, running through pump (40), connected to the fuel cell unit (2) for discharging the fuel cell waste products from the fuel cell unit (2), and a second line connecting the first line to the adsorption accumulator (5) for feeding the fuel cell waste products to the adsorption accumulator, the method comprising: when the fuel cell system (2) is starting up, heating coolant in the cooling circuit via the heat exchanger (51) using heat stored in the adsorption accumulator (5), with the fuel cell waste products being fed to the adsorption accumulator (5) at the same time, the fuel cell waste products inherently including waste gas (paragraphs 0019-0020), and in normal operation, feeding heat to the adsorption accumulator (5) via the heat exchanger (51) with the coolant in the cooling circuit heated by the heat exchanger (25) of the fuel cell unit (2) being fed to the heat exchanger (51) (paragraph 0020).

With regard to Claim 8, Honda et al. discloses wherein the adsorption accumulator (5) includes a silica gel adsorbent material (52) (paragraph 0012).

With regard to Claim 9, Honda et al. discloses the fuel cell waste products inherently include water vapor and the adsorption accumulator (5) is adapted to produce thermal energy by bonding the water vapor (paragraph 0012). The phrase "adapted to produce thermal energy by bonding the water vapor", is considered functional language and imparts intended use to the structural features of the claim. The prior art teaches

the structural limitations of the claim, including the structural limitations required by the functional language.

With regard to Claim 10, Honda et al. discloses wherein the heat exchanger (51) is adapted to transfer the thermal energy produced by the adsorption accumulator (5) from the adsorption accumulator (5) to the cooling circuit (paragraph 0012). The phrase "adapted to transfer the thermal energy produced by the adsorption accumulator from the adsorption accumulator to the cooling circuit", is considered functional language and imparts intended use to the structural features of the claim. The prior art teaches the structural limitations of the claim, including the structural limitations required by the functional language.

With regard to Claim 11, Honda et al. discloses wherein the cooling circuit is adapted to transfer the thermal energy produced by the adsorption accumulator (5) to the fuel cell (2) to facilitate a cold start of the fuel cell (paragraph 0019). The phrase "adapted to transfer the thermal energy produced by the adsorption accumulator to the fuel cell to facilitate a cold start of the fuel cell", is considered functional language and imparts intended use to the structural features of the claim. The prior art teaches the structural limitations of the claim, including the structural limitations required by the functional language.

With regard to Claim 12, Honda et al. discloses an actuator (41) coupled between the fuel cell (2) and the adsorption accumulator (5), the actuator (41) being adapted to pass the fuel cell waste products from the first line to the second line during a cold start of the fuel cell system and to prevent the passage of the fuel cell waste

products from the first line to the second line after the cold start (paragraph 0013). The phrase "adapted to pass the fuel cell waste products from the first line to the second line during a cold start of the fuel cell system and to prevent the passage of the fuel cell waste products from the first line to the second line after the cold start", is considered functional language and imparts intended use to the structural features of the claim. The prior art teaches the structural limitations of the claim, including the structural limitations required by the functional language.

With regard to Claim 13, Honda et al. discloses a second actuator (42) located between the fuel cell (2) and the heat exchanger (51), the second actuator (42) adapted to pass coolant heated by the fuel cell (2) to the heat exchanger (51) to charge the adsorption accumulator (5) after the cold start (paragraph 0020). The phrase "adapted to pass coolant heated by the fuel cell to the heat exchanger to charge the adsorption accumulator after the cold start," is considered functional language and imparts intended use to the structural features of the claim. The prior art teaches the structural limitations of the claim, including the structural limitations required by the functional language.

With regard to Claim 14, Honda et al. discloses wherein the actuator (41, 42) is a three-way valve (paragraph 0015).

(10) Response to Arguments

The instant claims upon appeal are to a fuel cell system for mobile use. The fuel cell system comprises a fuel cell unit, a cooling circuit having a heat exchanger

downstream of the fuel cell unit, an adsorption accumulator forming a heat store adapted to release heat when adsorbing fuel cell waste products and being operatively thermally connected to the heat exchanger, and a first line for discharging waste products from the fuel cell unit and a second line connected to the first line for feeding the fuel cell waste to the adsorption accumulator. It is known in the art that fuel cell systems for mobile use are made up of several components which are in close communication with one another so that they are able to be easily transported and the system components are connected via lines. These lines can be any variety of lines, such as, electrical lines including power lines or electrical connections, or mechanical lines including piping, and fluid and/or gas conduits.

Arguments based on the rejection of Claims 5, 6, and 9 to 14 under 35 U.S.C. 102(b) as being anticipated by Honda et al. (JP 10-144333)

Appellants state, "adsorber 5 of Honda et al. in no way forms a heat store adapted to release heat when adsorbing the fuel cell waste products. Honda et al. completely fails to disclose such a relationship between fuel cell 2 and adsorber 5 and does not even mention any use at all for waste products of fuel cell 2."

Honda et al. clearly indicates in Drawings 1 and 2, as well as in paragraphs 0009-0012, the adsorber 5 comprises a heat exchange part 51, where heat exchange fluids flow, and a plurality of granular adsorbents 52 which absorb an adsorptive medium (for example water) by being cooled and desorb the absorptive medium by being heated. The water, or adsorptive medium, is a waste product of the fuel cell unit 2 and flows from the fuel cell discharge portion to the adsorber 5 through fluid circuit A.

Honda et al. further teaches in paragraph 0019, the heat exchange fluid, or fuel cell waste water, becomes heated because the absorption heat generated from the absorption in adsorber 5 is released into the heat exchange fluid that flows through the heat exchange part 51. That is to say that the outlet temperature becomes higher than the inlet temperature. Then, the heated heat exchange fluid is circulated to the heat exchange part 25 of the fuel cell 2 by going through fluid circuit A and the heated heat exchange fluid releases its heat in the heat exchange part 25, thus heating the fuel cell 2. Therefore, Honda et al. makes it clear that a correlation between the fuel cell 2 and the absorber 5 does exist. Honda et al. also teaches that the heat absorber forms a heat store and releases heat, as is claimed in the instant invention.

Appellants state, "the Office Action does not even attempt to point out in Honda et al. where the "first line" or the "second line" of claim 5 are disclosed in Honda et al. The only connection between fuel cell 2 and adsorber 5 described in Honda et al. is hydraulic circuit A, which he Examiner alleges corresponds to the "cooling circuit" of claim 5, and which clearly is not the "first line" or the "second line" required by claim 5. Additionally, Honda et al. does not even mention what happens with waste products of fuel cell 2 and thus in no way discloses the claimed relationship between a fuel cell, a first line, a second line and an adsorption accumulation required by claim 5."

The Office Action dated March 23, 2009, specifically points out on page 3, that a "first line" is connected to the fuel cell unit 2 discharging waste from the fuel cell and runs through pump 40 and, a "second line" connects the "first line" to the adsorption accumulator 5. In the instant invention, there is no indication in the claim language that

the "first line" and the "second line" must be two separate lines. In fact, the claim language states, "a second line connecting the first line to the adsorption accumulator", which, when given its broadest reasonable interpretation could be understood as being just one long line made up of a combination of a "first line" being connected to the "second line". Appellants go on to state that there is a connection between the fuel cell 2 and the adsorber 5 (which clearly contradicts the argument presented above which states that there is no relationship between the fuel cell 2 and the adsorber 5) and that this connection is through hydraulic circuit A. The claimed "cooling circuit" in the instant invention is circuit A and comprises a "first line" which is connected to the fuel cell unit 2 discharging waste from the fuel cell and runs through pump 40 and, a "second line" which connects the "first line" to the adsorption accumulator 5. While Appellant argues that the "cooling circuit" is distinct from both the "first line" and "second line", the claim language does not specifically state that the cooling circuit does not and cannot include the "first line" and "second line". In fact, the "first line", "second line" and "cooling circuit" are each described structurally in the claim language so as to be linked together and be part of the same fuel cell system circuit. Honda et al. also discloses in paragraph 0023, when the fuel cell 2 is in a steady state of power generation as the fuel cell 2 continues to generate power, the temperature of the fuel cell 2 will gradually increase and water that is generated by the fuel cell is heated in the fuel cell 2 heat exchange part 25 and further released to the heat exchange part 51 of the adsorber 5. Therefore, Honda et al. does disclose what happens with waste products of fuel cell 2.

Appellants argue, "the water generated by anode 22 of fuel cell 2 is not the heat exchanging fluid circulated by hydraulic circuit A. As shown in Figure 2 of Honda et al., the heat exchanging fluid passing through heat exchanger 25 of the fuel cell 2 is independent of any water produced in anode 22 of fuel cell 2. If the water generated by fuel cell 2 was the heat exchanging fluid, no heat exchanging fluid could flow through heat exchanging part 51 at the precise moment that the fuel cell is started."

As stated above and in found in paragraph 0023 of Honda et al., when the fuel cell 2 is in a steady state of power generation as the fuel cell 2 continues to generate power, the temperature of the fuel cell 2 will gradually increase and water that is generated by the fuel cell is heated in the fuel cell 2 heat exchange part 25 and further released to the heat exchange part 51 of the adsorber 5. Water, as well as waste gas, are inherent byproducts of a fuel cell when in a steady state of power generation. The method claim limitations of the instant invention state that when the fuel cell system is starting up, heating coolant in the cooling circuit should happen at the same time fuel cell waste products are being fed to the adsorption accumulator. Honda et al. states in paragraph 002, "the fuel cell 2 can be warmed up rapidly and the power generation efficiency of the fuel cell 2 can be improved rapidly." Moreover, heat exchange fluid is supplied to the heat exchange part 51 of the adsorption device 5 from the heat exchange part 25 of the fuel cell 2. Also, it is known in the art that at start up, the components of a fuel cell system may still contain coolant within the components if they have not been previously drained. Therefore, it is not out of the realm of possibility that heat exchanging fluid could flow through heat exchanging part 51 at the precise

moment that the fuel cell is started, and rapidly receive the waste byproducts of the fuel cell shortly thereafter.

Arguments based on the rejection of Claim 12 under 35 U.S.C. 102(b) as being anticipated by Honda et al. (JP 10-144333)

Appellants argue that, "the three-way valve 41, which Examiner alleges corresponds to the "actuator of claim 12, is a part of hydraulic circuit A of Honda et al., which the Examiner alleges corresponds to the "cooling circuit" of claim 5, and thus in no way has the structure that is adapted to interact with the claimed "first line" and the "second line" as required by Claim 12.

Appellant's argument is not persuasive. The three-way valve 41 of Honda et al. does lie within the hydraulic circuit A , precisely at the point at which the "first line" which runs from the fuel cell 2 through pump 40 connects with the "second line" that further runs from the three-way valve 41 to the adsorber 5. Hydraulic circuit A of Honda et al. corresponds with the "cooling circuit" of the instant invention. The claim limitations involving the "cooling circuit" do not give the "cooling circuit" structural limitations other than to state that the cooling circuit is "assigned to the fuel cell unit" and has a "heat exchanger downstream of the fuel cell unit". There is nothing in the claim limitations to suggest that the "cooling circuit" cannot contain actuators, valves, lines, pumps or any other structural features. The "cooling circuit" is just "assigned to the fuel cell unit". The three-way valve 41 of Honda et al., no matter whether it is called a valve or an actuator,

is definitely adapted to interact with the "first line" and the "second line", as stated in the rejection made of record.

Arguments based on the rejection of Claim 13 under 35 U.S.C. 102(b) as being anticipated by Honda et al. (JP 10-144333)

Appellants argue that "the three-way-type selector valve 42, which the Examiner alleges corresponds to the "second actuator" of claim 13, is adapted to pass heat exchanging fluid from heat exchanging part 51, which the Examiner alleges corresponds to the claimed "heat exchanger," to fuel cell 2. As shown by the arrow between valve 42 and heat exchanging part 51 in Fig. 1 of Honda et al., valve 42 is not adapted to pass any fluid from fuel cell 2 to heat exchanging part 51 and thus is not arranged within the claimed system as required by claim 13."

In the rejection made of record, the phrase "adapted to pass coolant heated by the fuel cell to the heat exchanger to charge the adsorption accumulator after the cold start," is considered functional language and imparts intended use to the structural features of the claim. The Honda et al. reference teaches the structural limitations of the claim, including the structural limitations required by the functional language.

Arguments based on the rejection of Claims 7 and 8 under 35 U.S.C. 102(b) as being anticipated by Honda et al. (JP 10-144333)

Appellants argue that, "Honda et al. does not disclose feeding any waste products from fuel cell 2 to adsorber 5. As discussed above with respect to the

corresponding apparatus claim, Honda et al. does not even mention any use at all for waste products of fuel cell 2."

Honda et al. clearly indicates in Drawings 1 and 2, as well as in paragraphs 0009-0012, the adsorber 5 comprises a heat exchange part 51, where heat exchange fluids flow, and a plurality of granular adsorbents 52 which absorb an adsorptive medium (for example water) by being cooled and desorb the absorptive medium by being heated. The water, or adsorptive medium, is a waste product of the fuel cell unit 2 and flows from the fuel cell discharge portion to the adsorber 5 through fluid circuit A. Honda et al. further teaches in paragraph 0019, the heat exchange fluid, or fuel cell waste water, becomes heated because the absorption heat generated from the absorption in adsorber 5 is released into the heat exchange fluid that flows through the heat exchange part 51. That is to say that the outlet temperature becomes higher than the inlet temperature. Then, the heated heat exchange fluid is circulated to the heat exchange part 25 of the fuel cell 2 by going through fluid circuit A and the heated heat exchange fluid releases its heat in the heat exchange part 25, thus heating the fuel cell 2. Therefore, Honda et al. makes it clear that a correlation between the fuel cell 2 and the absorber 5 does exist.

Appellant further argues, "the Examiner has misinterpreted paragraphs [0018] to [0019] of Honda et al. Although, fuel cell 2 of Honda et al. generates water, the water generated by anode 22 of fuel cell 2 is not the heat exchanging fluid circulated by hydraulic circuit A. As shown in Fig. 2 of Honda et al., the heat exchanging fluid passing through heat exchanger 25 of fuel cell 2 is independent of any water produced in anode

22 of fuel cell 2. If the water generated by fuel cell 2 was the heat exchanging fluid, no heat exchanging fluid could flow through heat exchanging part 51 at the precise moment that the fuel cell is started."

As stated above and in found in paragraph 0023 of Honda et al., when the fuel cell 2 is in a steady state of power generation as the fuel cell 2 continues to generate power, the temperature of the fuel cell 2 will gradually increase and water that is generated by the fuel cell is heated in the fuel cell 2 heat exchange part 25 and further released to the heat exchange part 51 of the adsorber 5. Water, as well as waste gas, are inherent byproducts a fuel cell when in a steady state of power generation. The method claim limitations of the instant invention state that when the fuel cell system is starting up, heating coolant in the cooling circuit should happen at the same time fuel cell waste products are being fed to the adsorption accumulator. Honda et al. states in paragraph 002, "the fuel cell 2 can be warmed up rapidly and the power generation efficiency of the fuel cell 2 can be improved rapidly." Moreover, heat exchange fluid is supplied to the heat exchange part 51 of the adsorption device 5 from the heat exchange part 25 of the fuel cell 2. Also, it is known in the art that at start up, the components of a fuel cell system may still contain coolant within the components if they have not been previously drained. Therefore, it is not out of the realm of possibility that heat exchanging fluid could flow through heat exchanging part 51 at the precise moment that the fuel cell is started, and rapidly receive the waste byproducts of the fuel cell shortly thereafter.

(11) Related Proceedings Appendix

None.

For the above reasons, it is believed that all the rejections should be sustained.

Respectfully Submitted,

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